UNIVERSITY OF MINNESOTA

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and have found that it is complete and satisfactory in all respects, and that any and all revisions required by the final examining committee have been made.

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Date

Effects of Working at Home During COVID-19 on Sedentary Behavior, Use of Strategies to Decrease Sedentary Behavior, and Perceived Work Performance

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Abstract

The global pandemic caused by COVID-19 affected millions of workers in the United States and worldwide. Notably, many employees who previously worked in office buildings quickly shifted to working from their homes. The full effects of this new work context on employee sedentary behavior and performance are unknown. This study attempted to gain insight through surveying employees who continued to work from home. One hundred and ninety-six participants self-reported the amount of sedentary and non-sedentary activity in which they engaged during the workday, along with self-ratings of work performance, both before and during the COVID-19 pandemic. Minutes spent sitting (M_{Pre} = 419; M_{During} = 403.9), standing (M_{Pre} = 61.9; M_{During} = 37), and walking (M_{Pre} = 45.4; M_{During} = 28.1) decreased; results show that participants engaged in more sedentary and less non-sedentary behavior. Self-rated performance decreased 5% (M_{Pre} = 8.13; M_{During} = 7.62). Results also showed a weak positive association between standing and performance (τ_b = .169, p = .006) and a medium positive association between walking and performance (τ_b = .254, p = .001), suggesting those who were less sedentary while working from home performed better. The implications of these results are that employees who are more sedentary while working from home may be less productive and less healthy. Organizations should take steps to increase the amount of standing and walking that their employees engage in throughout the workday for employees who continue to work remotely.

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COVID-19 drastically changed the experience of workers, and the full effects of these changes are yet to be determined. The 2019 Novel Coronavirus, referred to as COVID-19, was deemed a global pandemic by the World Health Organization (WHO) on March 11, 2020 (WHO, 2020). President Trump declared a national emergency due COVID-19 on March 13, 2020 (Trump, 2020), significantly affecting the United States workforce and the way in which work continues to be done. For example, on March 25, 2020, Minnesota Governor Tim Walz issued an executive order requiring all Minnesota residents to stay home unless their work was in a critical sector, or they were engaging in an approved activity (Walz, 2020). Similar orders were put into place across the country; in April and May, a survey found that about half of the American workforce was working from home and another 10% had lost their job (Brynjolfsson et al., 2020). By the end of June, 42% of Americans were working from home and 33% were not working, according to a survey by Stanford University (Wong, 2020).

While the full effects of this rapid switch to work-from-home are unknown, one identified risk of this required isolation and new work-from-home setting is an increase in sedentary behavior (Ricci et al., 2020), which is supported by findings from recent research on work-from-home workers, such as medical coders, of whom most report sitting for 8 hours. (Jones, 2020). With some suggesting that that the move to work-from-home could be permanent (e.g., Barrero et al., 2020; Hern, 2020) it is important to investigate and address this increased risk for sedentary behavior. In fact, several major companies, including Facebook, Shopify, Twitter, and Coinbase, have already made

decisions to allow employees to work from home permanently (Newton, 2020), despite the lack of information about the effects of this unplanned work-from-home model on the workers.

Sedentary Behavior and Sedentary Work

Sedentary Behavior

Sedentary behavior is defined "any waking behaviour characterized by an energy expenditure ≤1.5 METs while in a sitting or reclining posture", where a MET is the average resting metabolic exertion of the population in question (Tremblay et al., 2017, p. 9). In a review of sedentary research literature, Tremblay et al. (2017) found that the Sedentary Behaviour Research Network's (SBRN) proposed definition of sedentary behavior has been widely cited and adopted by researchers (Mansoubi et al., 2015; Reilly et al., 2015).

Data from a representative, pre-COVID sample of Americans aged six years and older indicate that over 50% of time awake is spent engaged in sedentary behaviors (Matthews et al., 2008). In a more recent study of a representative American sample, Yang et al. (2019) found that adults in general spent 6.4 hours per day sitting. According to the U.S. Bureau of Labor Statistics (2018), over 165 million Americans work at least 40 hours a week, and sedentary work-lives are increasingly common in the United States.

Sedentary behavior is associated with several health risks, including increased risk and mortality from cancer, increased cognitive decline during the aging process, increased risk of heart attack, increased risk of stroke, and up to a 31% greater chance of pre-mature death than non-sedentary individuals (Tremblay et al., 2010). However, adults who replace sedentary behaviors with non-sedentary behaviors are likely to see improved

health effects (decreased incidence of mortality, poor cardiovascular health, type 2 diabetes, and some cancers), with greater effects for more vigorous exercise (e.g., Department of Health and Human Services, 2018; Katzmarzyk et al., 2020).

Sedentary Work

Aggregated data from the 1960s reveals that roughly half of the jobs held at the time, namely manufacturing, required at least moderate levels of metabolic activity; currently, however, only 20% of jobs involve in this level of activity (United States Department of Labor, 2016). The remaining 80% of employment in the United States consists of mostly "white collar" administrative work, service work, or work that results in low enough levels of metabolic expenditure to meet the sedentary work classification requirements. Lifestyles with frequent bouts of sedentary behavior are also associated with obesity, with sedentary individuals being between 50% and 105% more likely to be obese than non-sedentary individuals (Proper et al., 2006). The decrease in the average expenditure of energy from lack of physical activity within the U.S. work force has negatively affected average national weight at a rate of over 100 less calories being burned per person on average daily by activities related to occupation compared to the 1960s (Church et al., 2011). The move to work-from-home may push this trend even further.

The biggest contributor to sedentary behavior at work is sitting; in addition to resulting in minimal caloric expenditure, sitting is associated with increased risk for developing musculoskeletal illness and circulatory illnesses (Ploeg, 2012). In many instances, employees are required to sit while working due to the nature of their work and the type of workstation or other work equipment provided to them. These factors have led

to roughly 75% of Americans sitting at least four awake hours a day, with over 25% sitting for at least eight hours a day (Ploeg, 2012).

Sitting is a particularly common problem that has been shown to be associated with many health issues. Namely amongst the issues are back injury, upper limb musculoskeletal disorders, and postural stress (Buckle & Buckle, 2011), which are frequently caused by underuse and atrophy of muscle groups. The prevalence and severity of these and other negative health outcomes may be addressed, in part, with organization-wide interventions to reduce sedentary behavior.

Employees engaging in sedentary lifestyles and suffering the aforementioned consequences leads to two primary consequences for the companies that employ them. First, a massive financial loss exists among U.S. companies due to absenteeism as a result of obesity, caused at least in part by sedentary behavior. Witters and Agrawal (2011) estimated the total cost to American businesses due to loss of productivity caused by obesity to be $153 billion annually. This cost may actually increase if unwell employees choose to work in a diminished state due to their unwell state instead of being absent in order to pursue a wellbeing solution, being less productive until they are well.

Beyond the cost of lost productivity due to absenteeism, sedentary employees who develop the chronic conditions that commonly accompany sedentary lifestyles, such as postural stress and back injury, are among the most commonly paid worker's compensation claims per year, according to data published by Liberty Mutual (2017). The three areas that include consequences of sedentary lifestyles for the filing of worker's compensation claims are overexertion including outside sources, other exertion, and repetitive motions, totaling 32.5% of all money paid in worker's compensation, with a

total dollar amount around $18.5 billion dollars in 2017. It is unknown how the shift to work-from-home as a result of COVID-19 will affect these figures.

Remote Work and Sedentary Behavior

Remote work is the practice of completing job duties to support an organization while remaining at home or otherwise off-site instead of working in a traditional office environment with the other employees. Remote work (also referred to as telecommuting, telework, work-from-home) existed before COVID-19, though its effects on sedentary behavior are not fully understood. Jones (2020) identified that many medical coders sit for up to 8 hours per day while working remotely, and that 66% of that time is continuous sitting. Henke et al. (2016), however, found that employees who worked remotely between 9-32 hours (the equivalent of one to four eight-hour workdays) per month were 1.3% less likely to be physically inactive than non-telecommuters; those who commuted more than 32 hours per month were 2.4% less likely to be physically inactive. Henke at al. (2016) did not examine the effects of remote work at greater than 73 hours (nine eight-hour workdays) per month; thus, findings may not generalize to employees working from home due to COVID-19, as many have been and continue to working remotely all or most days per week. Chakrabarti's (2018) findings also support the U-shaped relationship between remote work; frequent telecommuters were 71% more likely to report 30 minutes of physical activity on typical remote workdays than those who did not work from home. Like Henke et al. (2016), Chakrabarti (2018) did not examine the effects of telecommuting more than four days per month.

Before COVID-19, many organizations supported initiatives to reduce sedentary behavior for on-site employees, such as providing active workstations, software to

encourage non-sedentary behavior, and other solutions (discussed in more detail the next section). The same support for remote workers, however, was less common. For example, Montreuil and Lippel (2003) surveyed 63 remote workers, including support staff, professionals, salespeople, and administrators, from several different organizations. Almost all reported being more productive due to fewer interruptions (such as by colleagues). However, about 60% reported they received no support from their employers for at-home workstations, and over half developed musculoskeletal issues from working from home. Workers have shown increased productivity and improved health outcomes when provided with equipment to reduce sedentary behavior (discussed in more detail below; e.g., Ben-Nar et al., 2014); therefore, remote workers may become more productive and experience fewer negative consequences associated with sedentary behavior with added support from their employers while working from home.

Strategies to Reduce Sedentary Work Behavior

Employers and individuals alike have attempted to reduce sedentary work behavior. For example, Eli Lilly, an international pharmaceutical company, includes a full ergonomic assessment, issues ergonomic equipment, and provides behavior-modifying software as part of its onboarding process. This includes ergonomic desks that are usable in both sitting and standing positions, as well as software that stops the use of computers to encourage workers to take a break and engage in non-sedentary activities (Eli Lilly and Company, 2006). Other organizations with initiatives, such as standing desks, to reduce employee sedentary behavior include Chevron, Boeing, Apple, and Google (Lohr, 2012). In addition, health-conscious individuals modify their behavior to reduce or remedy the effects of sedentary work. For example, individuals report going to

a gym before and after work or taking breaks to walk briefly after working for a set period (Jones, 2020). A more detailed overview of strategies to reduce sedentary work behavior follows.

Active Workstations

Workstations designed to reduce sitting or decrease sedentary behaviors are often referred to as active workstations. A review of available literature indicated three main solutions to reduce sedentary behavior in the form of active workstations: under desk cycles, standing desks, and walking treadmills. Factors to consider when evaluating active workstations for work-from-home use include the initial costs (typical ranges are $25-$80 for mini-cycles, $100-$500 for standing desks, $500-$3000 for treadmill desks), the space requirements, and other factors including the potential difficulty of simultaneously engaging in both strategic movement and work behavior, the effect the intervention has on the raw amount of work that is done, and additional stressors that other employees might experience (e.g., sweatiness, distracting noise). Harvard Health (Harvard Health Publishing, 2019) suggests that active workstations are a good way for employees to be less sedentary while working from home, but acknowledges that employees may be unable to acquire or use active workstations in their home environments.

Active workstations have been researched heavily, though the results of this research are varied. Standing desks are effective at reducing sitting time (Renaud et al., 2020) and reversing the negative health effects of sedentary behavior (Healy et al., 2008). However, the use of standing desks did not result in significant changes in performance when measuring the amount of time spent answering and finishing calls in a call center

(Chau et al. 2016) or evaluating efficiency (i.e., number of keystrokes, number of errors, and errors per minute) while completing a data entry task (Huseman et al., 2009). Under-desk cycles allow employees to remain seated which (Elmer & Martin, 2014) which may make them ineffective at addressing some consequences of sitting and also can lead to reduced performance (Straker et al., 2009), but are more effective at increasing metabolic exertion than standing (Dupont et al., 2020). Walking treadmills are better than standing desks or under desk cycles for some health outcomes (Cifuentes et al., 2015) but can make some work tasks, such as typing or clicking, more difficult.

One possible factor in adoption of active workstations in the workplace is that several studies reported increases in productivity when employees used active workstations, especially in studies that allowed a long period of use. The Stand More At Work (Edwardson et al., 2018) initiative showed an increase in self-report productivity after 6 months of using a height-adjustable standing workstation, combined with reinforcers to using the workstation, but did not show that increase in productivity after 3 months. Ben-Nar et al. (2014) compared the performance of employees who used a walking treadmill versus those who remained sitting while working in a year-long study and found that employees in the walking condition had higher supervisor ratings of performance, but this performance increase didn't reach its maximum value until after 30 weeks. While these timeframes may exceed most studies, they are likely reasonable timeframes for most organizations. This possible increase in performance compounds the value of healthier employees and may be a strong driver for employers to prevent sedentary behavior. It also may indicate that employees working from home could be more productive when provided with necessary resources to reduce sedentary behavior.

Ultimately, the research on active workstations was not conclusive before the pandemic, and there is no evidence that they're used widely in work-from-home during COVID-19. Therefore, the use of active workstations and other strategies to reduce sedentary behavior while working from home was evaluated in the current study.

Alternatives to Active Workstations

Beyond active workstations, other interventions in traditional workplaces designed to reduce sitting or other sedentary behaviors while working exist. Chu et al. (2016), as part of a meta-analysis, also identified studies which used counseling, goal-setting, fitness tests, education, internet-delivered programs, sedentary-reducing scheduled emails, software which regularly deactivates screens and reminds workers to engage in non-sedentary behavior, and others. Broadly speaking, the categories of interventions are educational/behavioral, environmental (e.g., active workstations), or a multi-component intervention including components of educational/behavioral interventions and an environmental intervention. Interestingly, every multi-component intervention that Chu et al. (2016) evaluated included a standing desk. While three out of five multi-component interventions in Chu et al. (2016) identified a significant reduction in workplace sitting (averaging an 89-minute reduction in an 8-hour workday), and six out of six environmental interventions reported a significant decrease in workplace sitting (averaging a 73-minute reduction in an 8-hour workday), only three of 15 educational/behavioral interventions reported a significant decrease in workplace sitting (averaging a 16-minute reduction in an 8-hour workday).

Parry et al. (2013) also compared multi-component interventions designed to reduce sedentary time. The first group of interventions included an active workstation,

standing or exercises between calls/document processing, walk and talk meetings, “active emails” (personally delivering the information in a message instead of emailing it), and increasing incidental activity in the workplace by taking longer routes to destinations. The second group of interventions included a pedometer challenge to increase walking in a day, promoting the use of non-sedentary means to go to work such as walking instead of taking the bus, walk and talk meetings, short and frequent walks during breaks and lunch, and increasing the use of the stairs. The third group of interventions included active sitting, such as sitting on the edge of the chair, moving while sitting, taking periodic breaks from sitting, using standing meetings, and using chairs without backs or air cushions to require more energy expenditure while sitting.

While the group of interventions with the active workstation led to the greatest reduction in sedentary time, 3.1 less hours of sedentary behavior, sedentary behavior was significantly reduced in all three group interventions. The groups involving active sitting and the pedometer challenge led to 1.4 and 0.6 less hours of sedentary behavior, respectively. The adjusted differences in reduced sedentary behavior among the three groups were not statistically significant. While some of these interventions (e.g., walking to work) are not possible when working from home, other strategies such as active sitting or frequent breaks can be done easily by most individuals working from home.

These studies highlight the breadth of options available to reduce sedentary behaviors in workers, beyond the use of active workstations. Strategies such as these may be even more appropriate in work-from-home environments. The results of these studies highlight the importance of interventions to decrease sedentary behavior in workers and

reinforce the need to evaluate the effects the work-environment changes of COVID-19 had on workers.

Work-From-Home (WFH) Strategies

Most of the previously discussed strategies are suitable for work-from-home. While active workstations require space and can be expensive, they can be purchased or fashioned out of household items (e.g., a stack of books to raise a laptop so its user can stand). Taking breaks from work to stand up or exercise may be easier in a work-from-home environment than a traditional workplace. For example, when interviewed, work-from-home medical coders reported taking frequent breaks to reduce the effects of their sedentary work (Jones, 2020). Employers can still provide employees with software to encourage breaks from sedentary behavior, as well as other resources like digital coaching or online education about sedentary lifestyles. The rate or intensity of which employees who are new to working from home as a result of uses these (or other) strategies is unknown, necessitating this study.

Support for Work-From Home Employees in Response to COVID-19

In response to the COVID-19 crisis, some companies provided varied forms of support to work-from-home workers. For example, Twitter, Shopify, Indeed, and Basecamp reimbursed the expenses of ergonomic equipment for their home to aid in healthier working (Nova, 2020). Deloitte released a health brochure that encouraged breaking up sedentary behavior by walking while on calls and taking breaks to walk (Deloitte, 2020). Researchers published information to help people across the world combat sedentary behavior while confined to their own homes (Ricci et al., 2020). It is as-of-yet unknown if these efforts to decrease sedentary behavior have been successful,

and this research provided further insight into the effects of working from home during COVID-19 on the prevalence of sedentary behavior and perceived levels of work performance.

Purpose of Current Study

The current study explored the impact of working at home during COVID-19 on the prevalence of sedentary behavior, the use of strategies to reduce sedentary behavior, and perceived levels of work performance. While the effects of non-sedentary behavior on work performance aren't conclusive, some research suggests that non-sedentary behavior improves performance. If findings suggest that impact of working at home during COVID-19 has increased sedentary behavior and decreased employees' perceptions of performance, organizations may consider adopting interventions to encourage non-sedentary behaviors in order to improve worker performance and wellbeing. This study explored the following questions to gain insight on the impact of working at home during COVID-19 (early January – early February 2021) on the prevalence of sedentary behavior, the use of strategies to reduce sedentary behavior, and perceived level of work performance in comparison to the pre-COVID-19 (December 2019 - February 2020) time period:

RQ1: Will individuals report different levels of sedentary behavior while working from home during COVID-19 in comparison to pre-COVID-19? It is hypothesized that individuals will report higher levels of sedentary behavior while working from home in comparison to the pre-COVID-19 time period.

RQ2: Will individuals report different levels of performance while working from home during COVID-19 in comparison to the pre-COVID-19 time period? It is hypothesized that employees will report lower level of performance.

RQ3: Will individuals who report increased levels of sedentary behavior while working from home during COVID-19 report different levels of performance than those who report lower levels of sedentary behavior? It is hypothesized that individuals who report increased levels of sedentary behavior while working from home will also report lower levels of performance in comparison to the pre-COVID-19 time period (i.e., there will be an inverse relationship between sedentary behavior and perceived levels of work performance).

Method

Participants

This study used a convenience sample of working adults who self-identified in response to postings on professional social media or emails distributed through organization lists and professional listservs. Individuals were eligible to participate if they met three criteria: (1) are at least 18 years of age, (2) were working for at least three months before COVID-19 impacted their work and continued to work the same job from home as a result of COVID-19, and (3) have worked from a personal residence at least three days per week in the past week. Informed consent was obtained from all participants, and the study did not begin until the University of Minnesota's Institutional Review Board approved all study methods and procedures.

A sample of 294 people consented to begin the study. Data for individuals who were ineligible to participate were removed from the study (n = 100). Of those 100

participants, 29 failed to meet the inclusion criteria (screening items 1-4); eight identified themselves as ineligible due to not working at home (survey item 15); seven individuals indicated they were working from home at least three days a week but then listed the number of days they were working from home as "2" (survey item 26); 56 stopped responding at various points during the survey, preventing use of their data in at least one analysis related to the study hypotheses.

The final sample of 194 participants includes individuals form whom some data was missing but for which their data could be used in at least one analysis related to the study hypotheses; as such, the sample sizes reported for individual analyses varied depending on the provided answers. Table 1 shows the sample characteristics.

Table 1

Demographic Characteristics of Participants

Variable	*n*	%
Sex Assigned at Birth		
Male	34	17.5
Female	160	82.5
Current Gender		
Male	34	17.5
Female	158	81.4
Cis-Gender Female Non-Conforming	1	.5
Agender	1	.5
Age		
18-24	1	.5
25-34	42	21.9

	35-44	44	22.9
	45-54	48	25
	55-64	46	24.5
	65-74	11	5.2
Race			
	American Indian or Alaskan Native	1	.5
	Asian	5	2.6
	Black or African American	1	.5
	White	175	90.2
	American Indian and White	4	2.1
	Asian and White	3	1.6
Marital Status			
	Single	40	20.6
	Married	143	73.7
	Separated	1	.5
	Divorced	10	5.2
Living Arrangements			
	Alone	16	8.2
	Alone with Pets	8	4.1
	With Partner	56	28.9
	With Partner and Child	24	12.4
	With Partner, Child, and Pets	34	17.5
	With Partner and Pets	37	19.1
Highest Educational Achievement			
	High School Diploma	10	5.2

Associates Degree	7	3.6
Bachelor's Degree	59	30.4
Master's Degree	72	37.1
Doctoral or Professional Degree	42	21.6
1-Year Tech School	1	.5
2-Year Business School	1	.5
Some College, No Degree	2	1

Procedure

Data collection occurred over a four-week period from January 6, 2021, until February 8, 2021. A recruitment message was disseminated via email to relevant organization email lists (i.e., Minnesota Community Action Programs HR, University of Minnesota Duluth's UMD Business Announce, University of Minnesota Morris's UM Morris UMMPOSTS), professional membership organizations (e.g., Northland Human Resources Association and the Minnesota Council of Nonprofits) and listservs (i.e., Occupational Health Psychology), as well as posted on the student investigator and faculty advisor's professional social media accounts. The recruitment message included a description of the study, inclusion criteria, participant requirements, and a link to the web-based survey hosted on Qualtrics (see Appendix A).

Participants accessed the study in Qualtrics via a link provided in an email or electronic (e.g., social media) posting. Participants were prompted to read and electronically provide consent (see Appendix B) and respond to screening items to confirm that they meet the inclusion criteria before proceeding to the remainder of the survey items. Participants who indicated that they met the inclusion criteria responded to

survey items to gather information about sociodemographic characteristics and job-related items. Then, participants responded to measures to assess sedentary behavior and work performance for both the pre-COVID-19 (December 2019 – February 2020) and during COVID-19 (January 2021– February 2021) time periods. A copy of the screening items and survey items is included in Appendix C.

Measures

Demographic characteristics and job-related information

The survey included nine questions to obtain participant sociodemographic information including gender, age, race, ethnicity, marital status, and highest level of educational attainment. Demographic characteristics are included in order to gain a broader understanding of the context of each participant's work environment and identify variables that might lead to differences in sedentary behavior or work performance.

The demographic questions are followed by four questions to obtain participant job-related information including job title, the effects of COVID-19 on work location, non-sedentary work breaks, and employer support for work-from-home. Job-related questions are included in order to evaluate differences across job types and descriptive information about what might contribute to sedentary or non-sedentary behavior while working.

Sedentary behavior

Sedentary behavior was assessed with the Occupational Sitting and Physical Activity Questionnaire (*OSPAQ*; Chau et al., 2012). The OSPAQ is a validated self-report instrument to assess the percentage of the occupational time spent sitting, standing, walking, and the time spent doing heavy labor. Participants were asked to estimate the

percent of time they spent doing each of those activities during a typical day in each of two time periods: pre-COVID-19 (December 2019 – February 2020) and during COVID-19 (time of survey completion between January 2021 – February 2021). For example, an individual might report 50% time spent sitting; 25% time spent standing; 25% time spent walking; 0% time spent heavy labor. Responses should sum to 100%. When validated with objective accelerometer data, the OSPAQ showed moderate validity for sitting (ρ = 0.65, $p < 0.01$), low but significant validity for standing ($\rho = 0.49$, $p < 0.01$), and weak but significant validity for walking ($\rho = 0.29$, $p < 0.05$).

For purpose of analysis, the percentages reported were transformed into minutes per day by taking the percentage reported, multiplying it by hours worked per day, and then converting from hours to minutes. For example, if an individual reported working for 8 hours per day and that they spent 50% of their time sitting, their time spent sitting was transformed to 4 hours or 240 minutes. In addition, participants were asked to report the number of breaks they took from sitting per hour of work.

Perceived work performance

Perceived level of work performance was assessed with a single-item self-performance question from the Health and Work Performance Questionnaire (*HPQ Employee Version*; World Health Organization, 2010), although two items will be included on the survey. First, participants were asked to respond to the following question: “On a scale from 0 to 10 where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, how would you rate the usual performance of most workers in a job similar to yours?”. This question was included to

maintain the validity of the tool by allowing participants to internally anchor the unanchored values (0-10) of the response; this question was not utilized in any analysis.

Then, participants were asked to respond to the following question: “On a scale from 0 to 10 where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, how would you rate overall job performance on the days you worked during [time period]. Participants rated perceived levels of work performance for each of the two time periods: pre-COVID-19 (December 2019 – February 2020) and during COVID-19 (time of survey completion between January 2021 – February 2021). A validation of the HPQ which measured construct validity was evaluated using hypotheses testing guidelines of the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) determined that the HPQ had moderate validity (Alheresh et al., 2017). Additionally, support for using only the performance measures was found in other research papers evaluating the effects of COVID-19 on performance (e.g., Ralph et al., 2020).

Study Design, A Prior Power Analysis, and Statistical Analyses

This study used a non-experimental design to examine the impact of working at home during COVID-19 on the prevalence of sedentary behavior, the use of strategies to reduce sedentary behavior, and perceived levels of work performance. Sedentary behavior and perceived work performance were evaluated across two time periods: pre-COVID-19 and during COVID-19.

An a priori statistical power analysis was performed for sample size estimation using G*Power 3 (Faul et al., 2017). Assuming an arbitrarily small effect size = 0.2, an alpha = .05, and a power = 0.8, the sample size needed was N = 52.

Shapiro Wilk tests were conducted on the relevant data for all variables being analyzed; all sets of data were found to deviate from normality. A Wilcoxon Signed Rank test was used to analyze the difference between sitting, standing, walking, and heavy labor performed during work and work performance before and during COVID-19. A Kendall's Tau correlation was used to analyze the association between changes in sedentary and non-sedentary behaviors and changes in performance. Data analyses utilized IBM SPSS 20 computer software.

Results

Reported in Table 2 is a comparison of the general context of participants' workday during the pre-COVID-19 and during-COVID-19 time frames, including the number of days worked per week, hours worked per week, and the number of breaks taken per hour. Data in this table represent those individuals who reported valid information for each pair of data per variable during both time periods.

Table 2

Means and Standard Deviations for Days and Hours Worked Per Week and Number of Breaks Per Hour

Variable	*n*	*M*	*SD*
Days Worked Per Week			
Pre-COVID	190	4.94	0.66
During COVID	190	4.99	0.95
Hours Worked Per Week			
Pre-COVID	172	42.83	6.78
During COVID	172	38.71	10.33
Breaks Per Hour			
Pre-COVID	185	1.66	3.94
During COVID	185	1.37	1.55

Note. Pre-COVID refers to the period between December 2019 and February 2020; During COVID refers to the period between January 2021 and February 2021).

Table 3 reports the activities that participants did while working from home, as part of adapting to the work-from-home environment. The percentages reported are the percentage of participants who indicated that they had engaged in any of the listed activities while working from home in the past week; participants were able to select multiple responses options from a list of eight activities. The data represent 151 of 194 individuals who provided valid responses to the survey item.

Table 3

Activities While Working from Home

Activity	*n*	*%*
Take frequent breaks from sitting (at least once every 30-60 minutes)	113	74.8%
Stand, cycle, or walk while talking	67	44.4%
Stand, cycle, or walk while listening in during a meeting	36	23.8%
Use a standing desk (includes homemade standing desks)	32	21.2%
Stand, cycle, or walk while watching a webinar	28	18.5%
Work at a high table or counter	27	17.8%
Use a bike or under-desk cycle	1	0.7%
Use a treadmill desk	1	0.7%

Levels of Sedentary and Non-Sedentary Behavior

Hypothesis 1 stated that individuals would report higher levels of sedentary behavior during COVID in comparison to the pre-COVID time period. Tests of normality of the differences scores between pairs of Pre-COVID and During COVID data for minutes sitting, standing, walking, and heavy labor per day were conducted with 155 valid pairs of data after excluding cases listwise. A Shapiro-Wilk test showed a

significant departure from normality for minutes sitting $W(155) = .90$, $p = < .001$; standing $W(155) = .71$, $p = < .001$; walking $W(155) = .92$, $p < .001$; and heavy labor $W(155) = .43$, $p = < .001$.

Because the differences between pairs of data were not normally distributed, a Wilcoxon Signed Ranks test was used to evaluate differences in median levels of sedentary and non-sedentary behavior between the Pre-COVID and During COVID time periods. On average, minutes sitting per day (sedentary behavior) was higher in the Pre-COVID ($Mdn = 420$) than the During COVID ($Mdn = 417.6$) time period; this difference was not statistically significant, $Z = 0.708$, $p = .479$. Minutes standing per day was higher in the Pre-COVID ($Mdn = 40$) than the During COVID ($Mdn = 24$) time frame; this difference was statistically significant, $Z = -5.733$, $p < .001$). Minutes walking per day was higher in the Pre-COVID ($Mdn = 33.8$) than the During COVID ($Mdn = 21.4$) time frame; this difference was statistically significant, ($Z = -5.730$, $p < .001$). Minutes of heavy labor was higher in the Pre-COVID ($Mdn = 0$) than the During COVID ($Mdn = 0$) time frame; this difference was statistically significant ($Z = -2.503$, $p = .012$). Taken together, results indicate that the overall amount of sedentary (sitting) behavior did decrease; the amounts of non-sedentary behavior (standing, walking, and heavy labor) decreased significantly, and in greater amounts on average. Overall, this led to a greater proportion of sedentary behavior, supporting Hypothesis 1.

Table 4

Mean, Standard Deviation, and Wilcoxon Signed-Ranks Test Results for Minutes of Sedentary and Non-Sedentary Behaviors

	Pre-COVID (Dec 2019 – Feb 2020)		During COVID (Jan – Feb 2020)			
Type of Behavior (minutes)	*M*	*SD*	*M*	*SD*	*Z*[a]	*p*
Sitting	419.0	128.9	403.9	111.3	-0.708	.479
Standing	61.9	72.1	37.0	58.4	-5.733	<.001
Walking	45.4	36.2	28.1	28.4	-5.730	<.001
Heavy Labor	4.2	13.2	1.6	7.1	-2.503	.012

[a]Based on negative ranks

Levels of Work Performance

Hypothesis 2 stated that individuals would report lower levels of work performance during COVID in comparison to the pre-COVID time period. Participants were asked to rate their performance on a scale of 1 (*worst*) to 10 (*best*). Tests of normality of the differences scores between pairs of Pre-COVID and During COVID data for performance were conducted with 193 valid pairs of data after excluding cases listwise. A Shapiro-Wilk test showed a significant departure from normality for performance, $W(193) = .88$, $p < .001$. A Wilcoxon Signed Ranks test was used to evaluate the differences in the median levels of self-reported work performance between the Pre-COVID and During COVID time periods. On average, the median Pre-COVID levels of performance ($Mdn = 8$, $M = 8.13$, $SD = 1.33$) was higher than the median During COVID levels of performance ($Mdn = 8$, $M = 7.62$, $SD = 1.79$); this difference

was statistically significant, $Z = -4.353$, $p = < .001$). These results support Hypothesis 2; self-reported performance was lower in the During COVID than Pre-COVID time period.

Relationship Between Sedentary Behavior and Work Performance

Hypothesis 3 stated that individuals who report increased levels of sedentary behavior while working from home would also report lower levels of performance in comparison to the pre-COVID-19 time period. Because the data for all variables were not normally distributed (see above) and fail the assumption of bivariate normality, Kendall's tau-b was used to evaluate the relationship between the four types of behavior and ratings of work performance for 154 participants (excluding cases listwise). There was a weak, negative correlation between sitting (sedentary behavior) and performance, which was not statistically significant ($\tau_b = -.077$, $p = .199$). There was a weak, positive association between standing and performance, which was statistically significant ($\tau_b = .169$, $p = .006$). There was a medium, positive association between walking and performance, which was statistically significant ($\tau_b = .254$, $p = .001$). There was a very weak, positive association between heavy labor and performance, which was not statistically significant ($\tau_b = .024$, $p = .738$). These results support Hypothesis 3; while the negative association between sedentary behavior and performance was not significant, the positive and significant relationships between non-sedentary behavior (standing and walking) support the hypothesis that being less sedentary is associated with higher performance.

Discussion

The results from this study suggest that the transition to work-from-home as a result of COVID-19 has had a negative impact on both sedentary work behavior and employee performance. Overall, the workers surveyed reported that they were sedentary

a greater proportion of the time after switching to work-from-home than before. This finding aligns with recent research that found that work-from-home workers in Tokyo reported 111 minutes of sedentary behavior per day more than non-work-from-home workers (Fukushima et al., 2021).

Participants' mean self-rating of work performance was approximately 5% worse during COVID-19 than before the pandemic. This result is dissimilar to other, pre-pandemic studies, as well as research conducting during the COVID-19 pandemic. For example, Bloom et al. (2013) reported that, after randomly assigning call center employees to either continue working in a traditional workplace or to work from home, performance of the work-from-home workers increased by 13%. Similarly, Mekonnen (2013) also found that teleworkers had significantly higher output, approximately 5% more per year, for reviewing patent submissions than non-teleworkers. During COVID, Maurer (2020) reported that 94% of 800 surveyed businesses indicated that their employees were more productive while working from home. Due to the unrestricted range of participants' job titles, as well as the self-report nature of the measures used, it is difficult to determine why this discrepancy exists.

Finally, this study found non-sedentary behavior was positively associated with self-rated performance; that when time spent walking or standing went up performance also went up. The association between non-sedentary behavior was medium for walking and weak for standing. This study also identified a non-significant negative association between sitting and performance; when sitting time increased, performance decreased. These results are supported by Puig-Ribera et al. (2015) who reported that workers who were more active were 1.7% more productive than workers who were inactive.

This study comes at a time when many organizations are considering a permanent switch to work-from-home, often as directly continuing the work-from-home started in response to COVID-19 (e.g., Barrero et al., 2020; Hern, 2020). The results of this study suggest that work-from-home may have a cost to the health of employees and the performance of workers for organizations. Supporting the possible permanent switch to work-from-home, some employees did report becoming less sedentary, increasing performance, or both. It is clear that more research should be done into this work-from-home switch before long-term decisions are made.

Strengths and Limitations

The convenience sample of participants, obtained primarily from networks within the state of Minnesota, and the self-report nature of the survey may limit the generalizability of findings from this study. The OSPAQ has low validity for measuring standing behavior and a weak validity for measuring walking behavior. This study found the strongest associations between performance and walking or standing; however, these effects may change when evaluated with a measure with greater validity.

In addition, items that asked participants to rate their "pre-COVID" experiences relied on the accuracy of participants' recall. Chastin et al., (2018) found that most respondents under-report sedentary behavior when compared with objective measurements. Therefore, it is possible that participants in this study also underrepresented their sedentary behavior. Another limitation to the generalizability of this study's finding is that we did not evaluate the specific job duties of participants. It may be that the increase or decrease in performance is better predicted by how well a

particular set of duties translated to a work-from-home environment from a traditional office environment.

The pandemic itself is also a variable that is difficult to account for and may limit the generalizability of this study's findings. It is possible that sedentary behavior increased due to the effect of increased social isolation due to governmental stay-at-home orders above and beyond simply working from home. For example, Golden et al. (2008) reported a significant, weak, negative correlation between isolation of teleworkers and worsening job performance; the more isolated teleworkers felt, the lower their performance. It is also possible that stress and confusion about the circumstances of the pandemic, or any other number of pandemic-specific factors, led to a decrease in performance. Oducado & Estoque (2021) reported that COVID-19 related stress was associated with decreased the academic performance of nursing students. The current study did not evaluate or control for stress; therefore, results from this study may not be generalizable to work-from-home experiences during a non-pandemic time period.

Because participants were asked to respond to questions with a narrow focus, factors that may be important may not have been investigated. For example, we did not ask whether participants had a dedicated, private home office space or if they were using a makeshift workspace (e.g., dining room table). In addition, biological variables that may have impacted exercise, health, or performance, such as weight or non-work exercise. Buckle & Buckle (2011) report that the sedentary nature of some positions led workers most workers in that role to become obese; only vigorous exercise outside of the workplace was associated with non-obesity. External factors similar to those were not investigated in our study. While the large variation in possible workspaces and

participants may help this study be more generalizable, the large variation of possible workspaces and participants may introduce many different confounding variables. Future studies may consider asking participants to take photos of their workspaces or to keep a journal of the events that happen during work; doing so may provide additional insight regarding factors that influence sedentary work behavior.

Future Research

Due to the novelty of the pandemic and the dramatic shift to work-from-home, this research does not have a direct predecessor, and there are many aspects of the work-from-home shift that must be further analyzed. One topic that future research might investigate is whether becoming more sedentary at work, outside of the context of a pandemic, leads to lower performance. While the results of this study indicate that those who reported walking less during the current workday than pre-COVID also reported lower performance than pre-COVID, an association between reduced walking (i.e., non-sedentary behavior) and lowered performance was not suggested in any literature reviewed as part of this study. To the contrary, Edwards and Loprinzi (2017) reported no negative effect on cognitive function among a group of adults who reduced the average amount of daily walking as part of an experiment. Other experimental studies examining the causal effects of reduced non-sedentary behavior were not found, possibly due to ethical concerns associated with the known negative effects of sedentary behavior. A related question to investigate further is whether the duration or types of activities performed during a work break impact performance. Slowiak et al. (2014) found that participants performed better a data entry task when they marched in place (movement condition) than when they sat or stood (stationary conditions) during breaks from

working on the task; 74.8% of participants in this study reported taking frequent work breaks (see Table 3).

Implications for Practice

The results of this study have several implications for practice. The most immediate implication is that a large-scale transition to work-from-home should be explored cautiously. The identified results of a more sedentary and lower performing workforce may lead to lower earnings and higher medical costs for organizations. This may also compound with presenteeism, or the factor of unwell employees working in a lower-performing state due to the health effects from their sedentary lifestyle. Presenteeism can lead to decreased performance over time in sedentary employees (Evers et al., 2014).

The next implication for practice is that work-from-home employees should receive interventions designed to address this increase in sedentary behavior. The first goal of these interventions should be to get employees back up to the normal level of non-sedentary behavior that employees reported pre-COVID, which may result in a return to the pre-COVID ratings of performance reported in these results. The results related to Hypothesis 3 indicated that employees who increased the amount of time spent sitting performed worse, and those who stood and walked more during their workday performed better. This implies that the amount of walking that those employees experienced pre-COVID may have been enough to maintain performance. The first step toward returning employees to pre-COVID levels of walking may be to identify which activities led to walking in the workplace pre-COVID. Some of the lost non-sedentary behavior could be from activities such as walking to the breakroom, going out to eat over

a lunch break, or visiting friends elsewhere in an office building. Using some of the interventions from Perry et al. (2013) may be enough to return employee behavior to normal with very little investment from employers; interventions such as pedometer challenges, standing meetings, and encouraging employees to take frequent walking breaks are effectively free and may increase non-sedentary behavior enough to return employee non-sedentary behavior to pre-COVID levels.

Another implication from the research is the need to identify and leverage the employees who were able to increase non-sedentary behavior and performance. Employees who are able to work from home without increasing their sedentary behavior or decreasing their performance could be valuable for the large-scale work-from-home switch that employers may be considering. Employees who are healthier and more productive outside of a traditional workplace may lead to lower employer costs and higher employer earnings.

Finally, the lowered performance found in this study combined with the literature reviewed for this study implies that the decreased performance and the increased sedentary behavior are unlikely to change without an intervention. Edwardson et al. (2018) and Ben-Nar et al. (2014) both reported that the maximum change in performance, after implementation of a workstation intervention, was discovered after a long period of time; 12 months and 30 weeks respectively. Data collection for the current study occurred approximately nine months after the change in work conditions due to COVID-19. If the long-term research on the use and impact of active workstations on performance is generalizable to the change in work environment during work-from-home, the lowered

levels of performance reported in this study are unlikely to improve without further intervention.

Conclusion

This study was conducted to help guide the decisions of employers to make the best choices for the wellbeing of their organization and their employees, in response to the changes brought on by COVID-19. We also hope that this study will serve as a starting point for more guided research on employees who are working from home. If this body of research is more fully developed, it may result in a workforce which does not have to commute and is healthier and more productive than existed pre-COVID.

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Appendix A

RECRUITMENT MESSAGES

Email & Facebook

Subject Line: Request for Survey Participation: Working from Home During COVID-19

We are recruiting individuals to participate in a survey to gather information about the prevalence of sedentary behavior, the use of strategies to reduce sedentary behavior, and perceived levels of work productivity while working from home. The aim of the study is to understand how sedentary behavior and work productivity may have changed for workers due to the COVID-19 pandemic to advance research as well as inform ways in which organizations can support employee wellbeing and performance.

To be eligible to participate, you must: (1) be at least 18 years of age, (2) have been working for at least three months before COVID-19 and continued to work the *same* job *from home* as a result of COVID-19, and (3) have worked from a personal residence at least three days per week in the past week.

The survey includes sociodemographic and job-related items, as well questions to gather information about your *current* level of activity and perceived work performance during a typical workday *relative to what was typical for you before Covid-19* (i.e., December of 2019 through February of 2020).

The survey will take approximately 20 minutes to complete, and your participation is voluntary. There are no foreseeable risks associated with participation, as no identifying information will be collected. This study has been reviewed by the University's Institutional Review Board and granted exemption from IRB review (IRB ID: STUDY00011791).

To participate in this voluntary survey, please use the following link: *Sedentary Behavior and Work Productivity While Working from Home During COVID-19 Survey*

If the link above doesn't work, please copy and paste this URL into your browser: https://umn.qualtrics.com/jfe/form/SV_cMabJ6CA3XnaKQB

The survey will remain open until February 6, 2021. If you have any questions about this study or issues accessing the survey, please email us directly.

Thank you,

David Huntley, Candidate, M.A. Psychological Science
Affiliation: University of Minnesota Duluth, Department of Psychology
Email: huntl067@d.umn.edu

Julie M. Slowiak, PhD, BCBA-D (Faculty Advisor)
Affiliation: University of Minnesota Duluth, Department of Psychology
Email: jslowiak@d.umn.edu

LinkedIn

Are you currently working the *same* job *from home* because of COVID-19, have worked from a personal residence at least 3 days in the past week, and 18 years of age? If so, please consider taking our research survey to share your experience of working from home during COVID-19.

The aim of the study is to understand how sedentary behavior and work productivity may have changed for workers due to the COVID-19 pandemic to advance research as well as inform ways in which organizations can support employee wellbeing and performance.

Feel free to share this post or the survey link below with others you know!

Survey Link: https://z.umn.edu/wfh-covid19

This research is being conducted out of the University of Minnesota Duluth, Psychology Department, by David Huntley (huntl067@d.umn.edu) and Julie M. Slowiak, PhD, BCBA-D (jslowiak@d.umn.edu). This study has been reviewed by the University's Institutional Review Board and granted exemption from IRB review (IRB ID: STUDY00011791)

Twitter (limit of 280 characters)

Opportunity to participate in research about working from home during COVID-19. Find out more: https://z.umn.edu/wfh-research-info

David Huntley, huntl067@d.umn.edu & Dr. Julie Slowiak, jslowiak@d.umn.edu, University of Minnesota Duluth. IRB ID: STUDY00011791

Instagram

Are you currently working the *same* job *from home* because of COVID-19, have worked from a personal residence at least 3 days in the past week, and 18 years of age? If so, please consider taking our research survey to share your experience of working from home during COVID-19.

The aim of the study is to understand how sedentary behavior and work productivity may have changed for workers due to the COVID-19 pandemic to advance research as well as inform ways in which organizations can support employee wellbeing and performance.

Feel free to share this post or the survey link below with others you know!

Survey Link (also in bio): https://z.umn.edu/wfh-covid19

This research is being conducted out of the University of Minnesota Duluth, Psychology Department, by David Huntley (huntl067@d.umn.edu) and Julie M. Slowiak, PhD, BCBA-D (jslowiak@d.umn.edu). This study has been reviewed by the University's Institutional Review Board and granted exemption from IRB review (IRB ID: STUDY00011791).

Instagram Picture

Appendix B

INFORMATION SHEET FOR RESEARCH

Sedentary Behavior and Work Productivity While Working from Home During COVID-19

You are invited to be in a research study to understand how sedentary behavior and work productivity may have changed for workers due to the COVID-19 pandemic. You were selected as a possible participant because you are at least 18 years of age, have been working for at least three months before COVID-19 and continued to work the *same* job *from home* as a result of COVID-19, and have worked from a personal residence at least three days per week in the past week. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: David Huntley and Julie M. Slowiak, PhD, BCBA-D, Department of Psychology, University of Minnesota Duluth

Procedures: If you agree to be in this study, we will ask you to complete a survey questionnaire containing sociodemographic and job-related items, as well as items to gather information about your current level of activity and perceived work performance during a typical workday relative to what was typical for you before COVID-19 (i.e., December of 2019 through February of 2020). Completing the survey will take approximately 20 minutes.

Confidentiality: The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting that relationship.

Contacts and Questions: The researchers conducting this study are David Huntley and Julie M. Slowiak, PhD, BCBA-D. You may email any questions that you have before agreeing to participate. If you have questions later, you are encouraged to contact Dr. Slowiak at the Department of Psychology, University of Minnesota Duluth, 218-726-7116, jslowiak@d.umn.edu.

This research has been reviewed and approved by an IRB within the Human Research Protections Program (HRPP). To share feedback privately with the HRPP about your research experience, call the Research Participants' Advocate Line at 612-625-1650 (Toll Free: 1-888-224-8636) or go to z.umn.edu/participants. You are encouraged to contact the HRPP if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research participant.
- You want to get information or provide input about this research.

Appendix C

SURVEY ITEMS

Screening Items (Inclusion Criteria)

1. Are you at least 18 year of age?
    a. Yes
    b. No

2. Have you been employed with the same employer since December 2019, at least?
    a. Yes
    b. No

3. Did you continue to work the same job from home as a result of a stay-at-home order or other COVID-19 guidance for any amount of time between March 2020 and today?
    a. Yes
    b. No

4. Have you worked from a personal residence at least three days per week in the past week?
    a. Yes
    b. No

Demographic & Job-Related Items

Demographic Items

5. What sex were you assigned at birth, on your original birth certificate?
    a. Male
    b. Female

6. How do you currently describe yourself?
    a. Male
    b. Female
    c. Transgender
    d. Other (fill in the blank) _____

7. Age (in years): _____

8. Ethnicity: Are you Hispanic or Latino? (select only one)
    a. No, not Hispanic or Latino
    b. Yes, Hispanic or Latino

   c. Prefer not to disclose
9. What is your race? (Regardless of how you answered Item #4, select one or more)
   a. American Indian or Alaska Native
   b. Asian
   c. Black or African American
   d. Native Hawaiian or Other Pacific Islander
   e. White
   f. Prefer not to disclose

10. Marital Status
   a. Single
   b. Married
   c. Widowed
   d. Separated
   e. Divorced

11. Current living arrangements (check all that apply)
   a. With partner
   b. With child/children
   c. Alone
   d. With parents
   e. Other (friends, roommates, or relatives)
   f. With pet(s)

12. Current work status
   a. Working from home
   b. Unemployed
   c. Working outside home – essential worker
   d. Furloughed
   e. Working outside home – not an essential worker
   f. Not disclosed

13. Highest Level of Education
   a. Below High School
   b. High School diploma
   c. Associate’s degree
   d. Bachelor's degree
   e. Master’s degree
   f. Doctoral or Professional degree
   g. Other (please specify): _____

Job-Related Items

14. Current Occupation/Job Title (please specify): _____

15. [15a] Did you shift from working outside your home (traditional workplace) to working from home as a result of COVID-19?
    a. Yes
    b. No

    [15b] If yes, how many days are you working from home this week?
    a. 1 day
    b. 2 days
    c. 3 days
    d. 4 days
    e. 5 days
    f. 6+ days

16. From the list of activities below, indicate any you have done while working from home in the past week (select all that apply):

    a. Take frequent breaks from sitting (at least once every 30-60 minutes)
    b. Stand, cycle, or walk while talking on the phone
    c. Stand, cycle, or walk while watching a webinar
    d. Stand, cycle, or walk while listening in during a meeting
    e. Use a bike desk or under-desk cycle
    f. Use a standing desk (homemade standing desks count)
    g. Work at a high table or counter
    h. Use or make a treadmill desk (position your work surface above a treadmill — with a computer screen and keyboard on a stand or a specialized treadmill-ready vertical desk — so that you can be in motion throughout the day)

Sedentary Behavior and Work Productivity Questions

Anchoring Item

1. On a scale from 0 to 10 where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, how would you rate the usual performance of most workers in a job similar to yours?

   [0] [1] [2] [3] [4] [5] [6] [7] [8] [9] [10]

Pre-COVID

1. How many hours did you work in an average week during December of 2019 through February of 2020? _____ hours

2. In an average week during December of 2019 through February of 2020, how many days were you at work? _____ days

Example: Jane is an administrative officer. Her work day involves working on the computer at her desk, answering the phone, filing documents, photocopying, and some walking around the office. Jane would describe a typical work day during December of 2019 through February of 2020 like this:

Sitting (including driving): 90 %
Standing: 5 %
Walking: 5 %
Heavy labour or physically demanding tasks: 0 %
Total: 100 %

3. How would you describe your typical work day during December of 2019 through February of 2020? (This involves only your work day, and does not include travel to and from work, or what you did in your leisure time)

    a. Sitting (including driving) _____%
    b. Standing _____%
    c. Walking _____%
    d. Heavy labour or physically demanding tasks _____%
    e. Total _____%

4. How many breaks from sitting (such as standing up, stretching, or taking a short walk) did you typically take during one hour of work between December and February?

5. On a scale from 0 to 10 where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, how would you rate overall job performance on the days you worked during December of 2019 through February of 2020?

[0] [1] [2] [3] [4] [5] [6] [7] [8] [9] [10]

Current (Last 7 Days)

1. How many hours did you work during the last 7 days? _____ hours

2. In the last 7 days, how many days did you work? _____ days

Example: Jane is an administrative officer. Her work day involves working on the computer at her desk, answering the phone, filing documents, photocopying, and some walking around the office. Jane would describe a typical work day during the last 7 days like this:

Sitting (including driving): 90 %
Standing: 5 %
Walking: 5 %
Heavy labour or physically demanding tasks: 0 %
Total: 100 %

3. How would you describe your typical work day while working from home during the last 7 days? (This involves only your work day, and does not include travel to and from work, or what you did in your leisure time)

    a. Sitting (including driving) _____%
    b. Standing _____%
    c. Walking _____%
    d. Heavy labour or physically demanding tasks _____%
    e. Total _____%

4. How many breaks from sitting (such as standing up, stretching, or taking a short walk) did you typically take during one hour of work while working from home during the last 7 days?

5. On a scale from 0 to 10 where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, how would you rate overall job performance on the days you worked from home during the last 7 days?

    [0] [1] [2] [3] [4] [5] [6] [7] [8] [9] [10]